The Promise of Regenerative Agriculture: Lessons learned from 1000 Farms

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Ecdysis Foundation
Blue Dasher Farm

ecdysis


Welcome To
FLORIDA
"Take Some Home"


FOR SALE


OF CHILDREN
AVISO

Voye and Lundgren. Environmental and production responses to regenerative citrus management. Sci Tot Environ, submitted

Conception

In 2022, the 1000 Farms Initiative was born

Neonicotinoids Affect Organisms in Ways We Don't Understand

70% of deer in MT had genital deformities and jaw deformities

Elise Hughes Berheim et al. 2019. Sci Reports 9: 4534

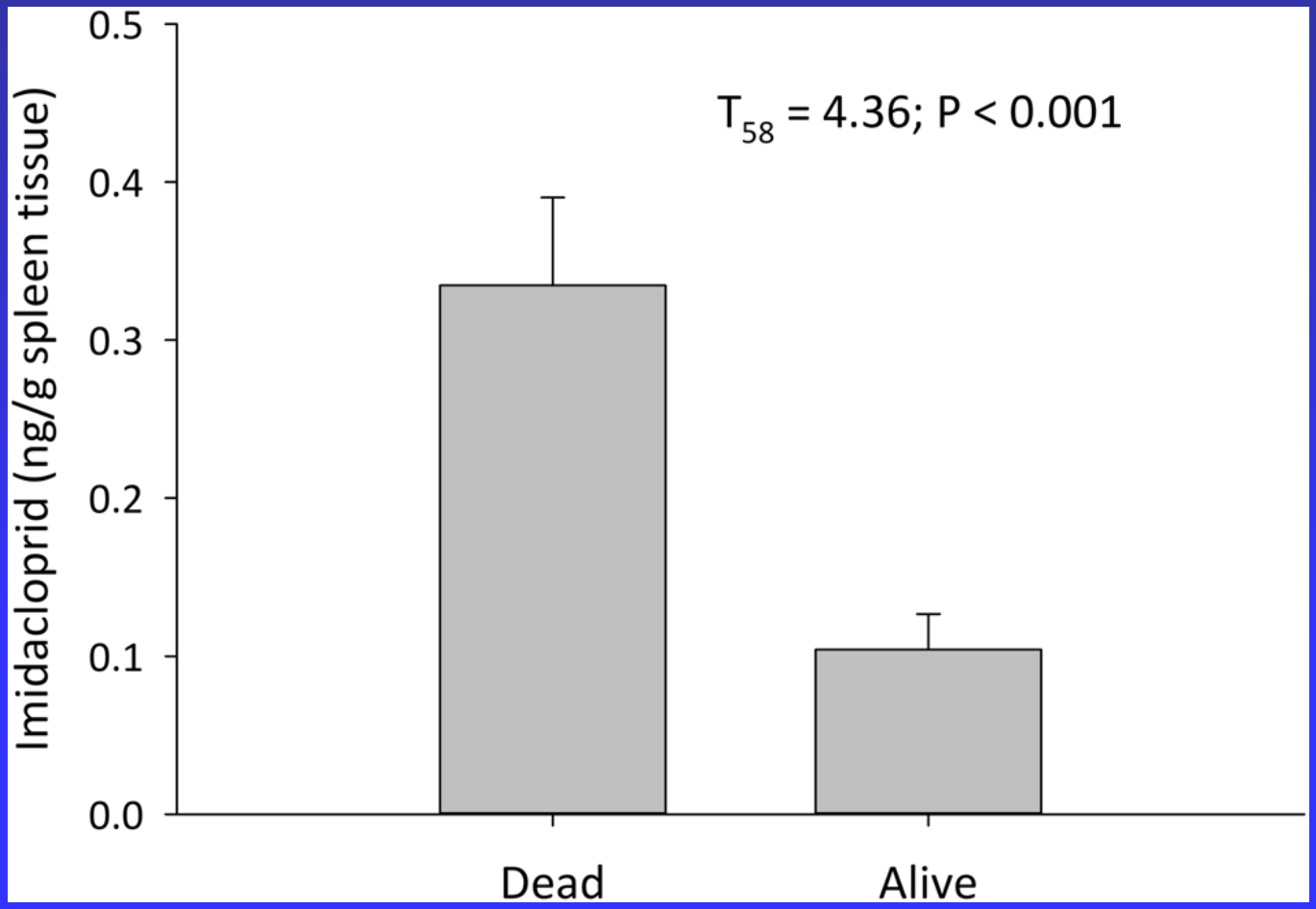
Does Imidacloprid Harm Deer?

A 2-year captive deer study

3 doses administered weekly in their water

Elise Hughes Berheim et al. 2019. Sci Reports 9: 4534

Imidacloprid and fawn mortality



More Imidacloprid in Spleens were Associated With Reduced:

fawn body weight

fawn thyroid hormone levels

fawn organ weights

fawn jawbone length

activity levels in adult deer

What are Spleen Imidacloprid Levels in Wild Deer?

Captive deer spleens
0.18 ng imidacloprid/g of spleen

ND wild deer spleens
0.60 ng imidacloprid/g of spleen

Contamination in ND Predators

Tested 100 each of hunter-killed fishers, bobcats, and river otters from MN.

> 15-30% of predators were contaminated with neonics.

Michel et al. 2026. Widespread exposure to neonicotinoid insecticide in bobcats (*Lynx rufus*), fisher (*Pekania pennanti*) and river otter (*Lontra canadensis*) in North Dakota. Ecotoxicology in press

61% of land in eastern Illinois is planted with neonics

1000 Farms: Health and Wellness

Based on 141 survey responses
PRELIMINARY! (data is rolling in now)

	Croppers	National Avg	
Allergies	41%	26%	↑58%
Asthma	16%	8%	↑100%
Anxiety	32%	31%	↑2%
Depression	25%	8%	↑212%
Parkinson's	5%	0.2%	↑2400%
Cancer	17%	5.5%	↑209%

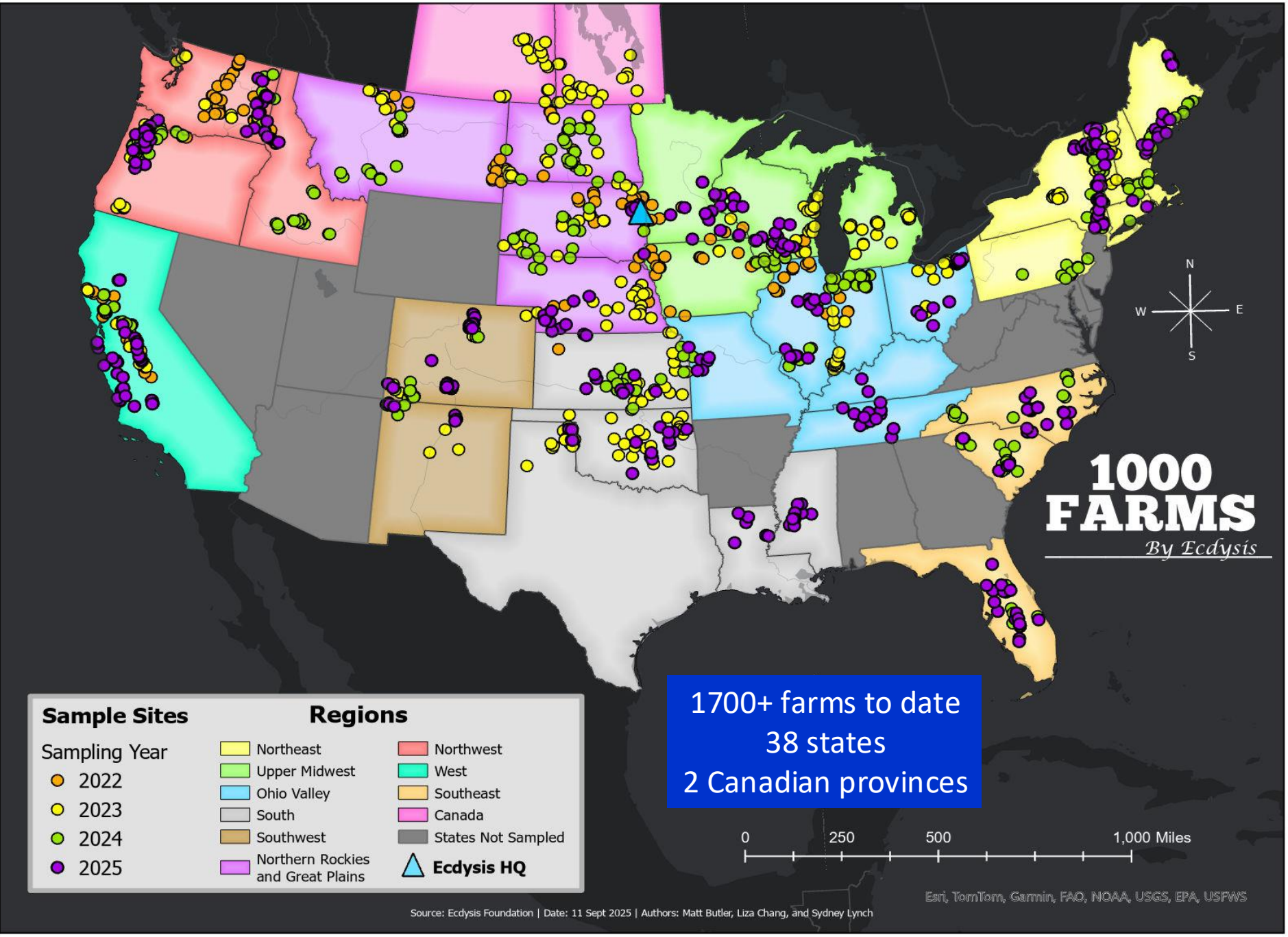
Regenerative Agriculture was Gaining Attention

Is it real?

We Thought Science Could Help

What Would A Project Look Like?

Best Folks For the Job?


1000 FARMS
By Ecdysis
N
W
E
S
1700+ farms to date
38 states
2 Canadian provinces
Sample Sites
Sampling Year
2022
2023
2024
2025
Regions
Northeast
Upper Midwest
Ohio Valley
South
Southwest
Northern Rockies and Great Plains
Northwest
West
Southeast
Canada
States Not Sampled
Ecdysis HQ
0
250
500
1,000 Miles
Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
Source: Ecdysis Foundation | Date: 11 Sept 2025 | Authors: Matt Butler, Liza Chang, and Sydney Lynch

Each Farm is Governed by a Management Philosophy

Conventional

Regenerative

Tillage
Bare soil
Monocropped
Synthetic chemicals

No-till
Plant diversity
Organic amendments
No synthetic chemicals
Livestock integration
(managed rotationally)

We assess this using a Regenerative Score (1-8)

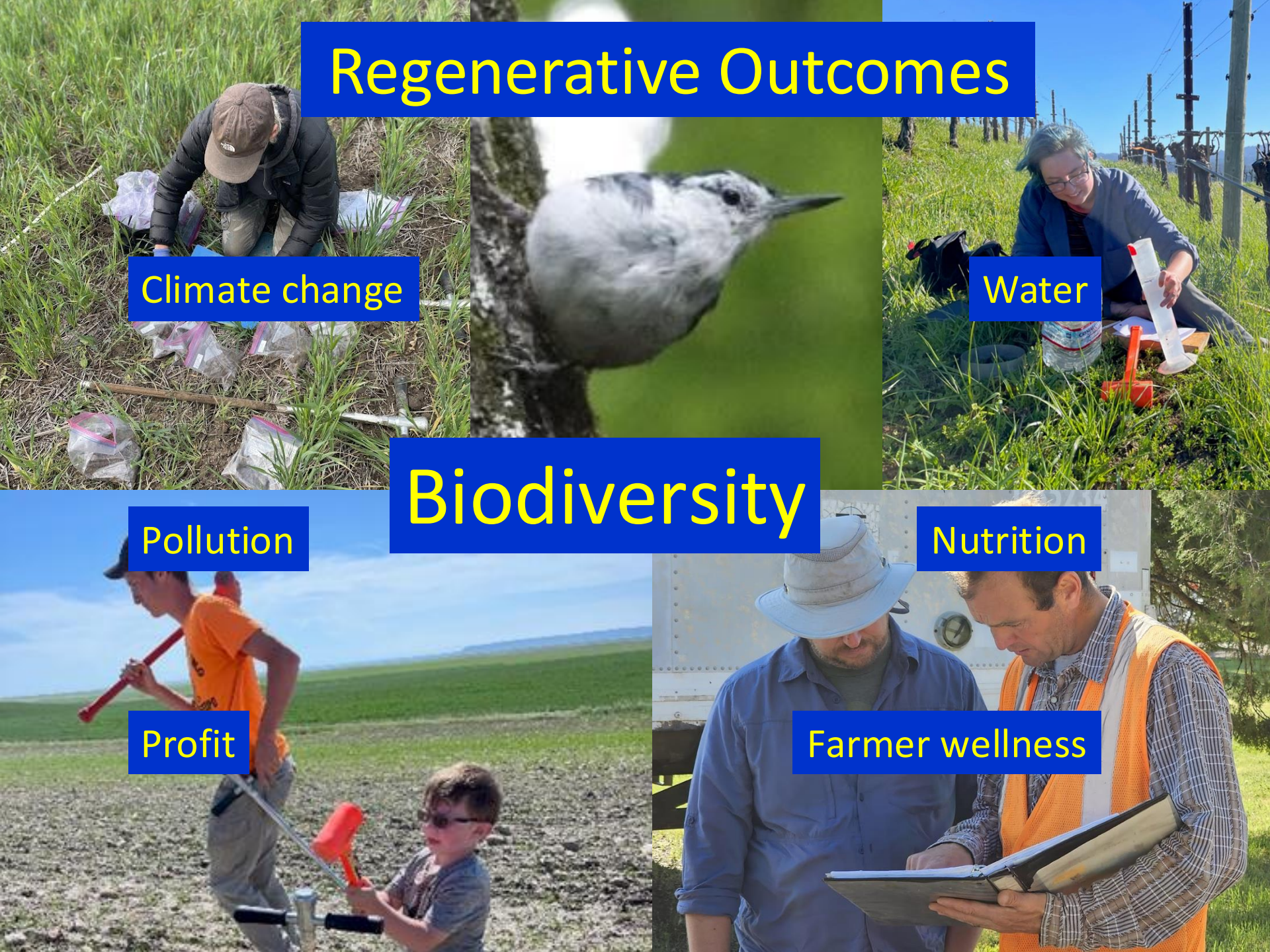
Fenster et al 2021. Faculty 1000Research 10: 115

Each Ranch Represents a Set of Management Practices

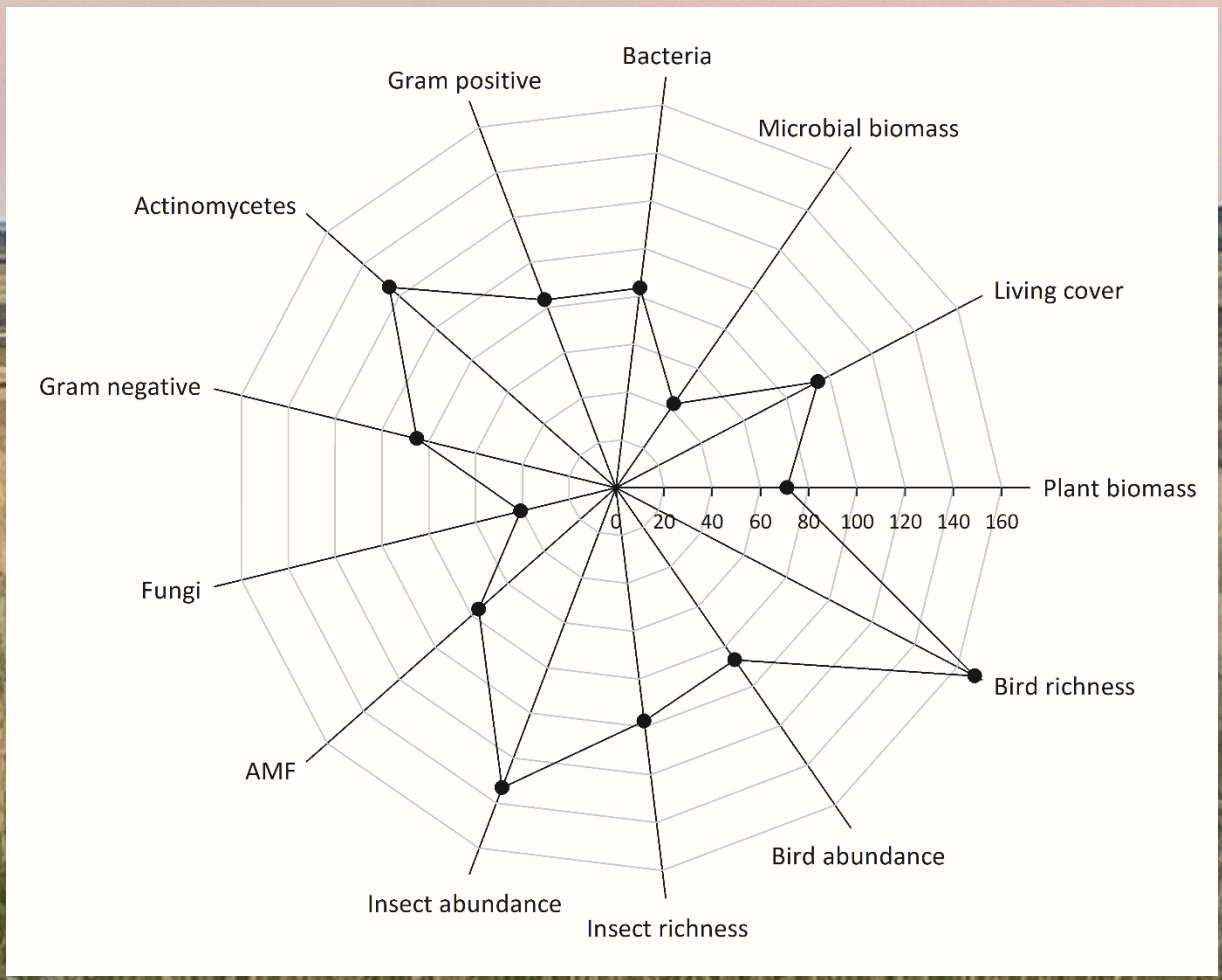
Conventional	Regenerative
Fewer animals Short rests Long grazes Multiple parasiticides	More animals Long rests Short grazes No parasiticides

We assess this using a Regenerative Score (1-8)

Fenster et al 2021. Faculty 1000Research 10: 115

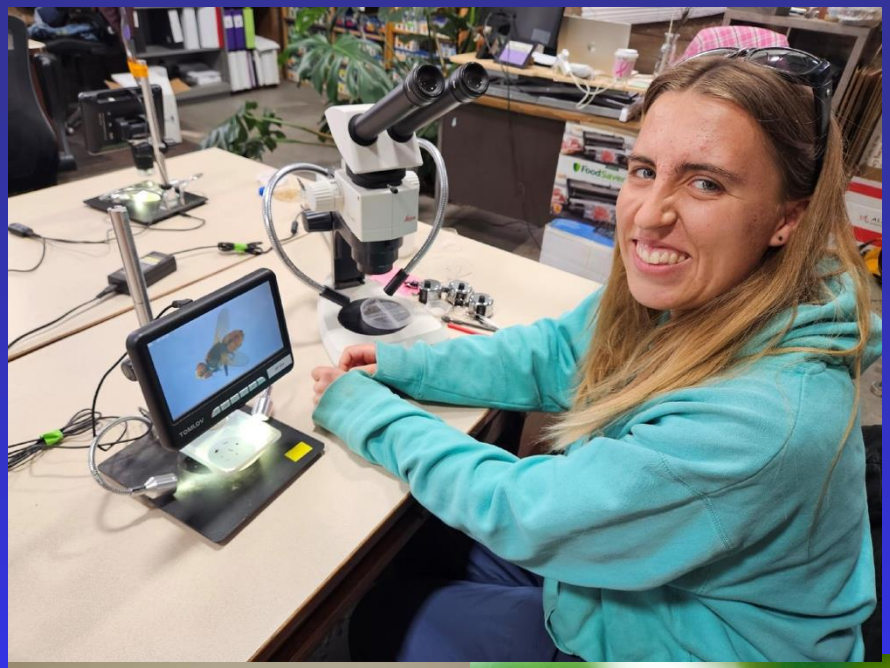

Regenerative Outcomes
Climate change
Water
Biodiversity
Pollution
Nutrition
Profit
Farmer wellness

Regenerative Agriculture Celebrates Life



Regenerative rangelands in North America

New Technology



Artificial intelligence
Ecoacoustics
Image recognition
eDNA

Welch, K. D., M. E. Wilson, and **J. G. Lundgren**. 2026. Evaluation of BugBox, a platform for AI-assisted bioinventories of arthropods. Journal of Animal Ecology, in press.

Does Regen Fight Climate Chaos?

Regenerative RANGELANDS store could store 4.5x the annual emissions of the US

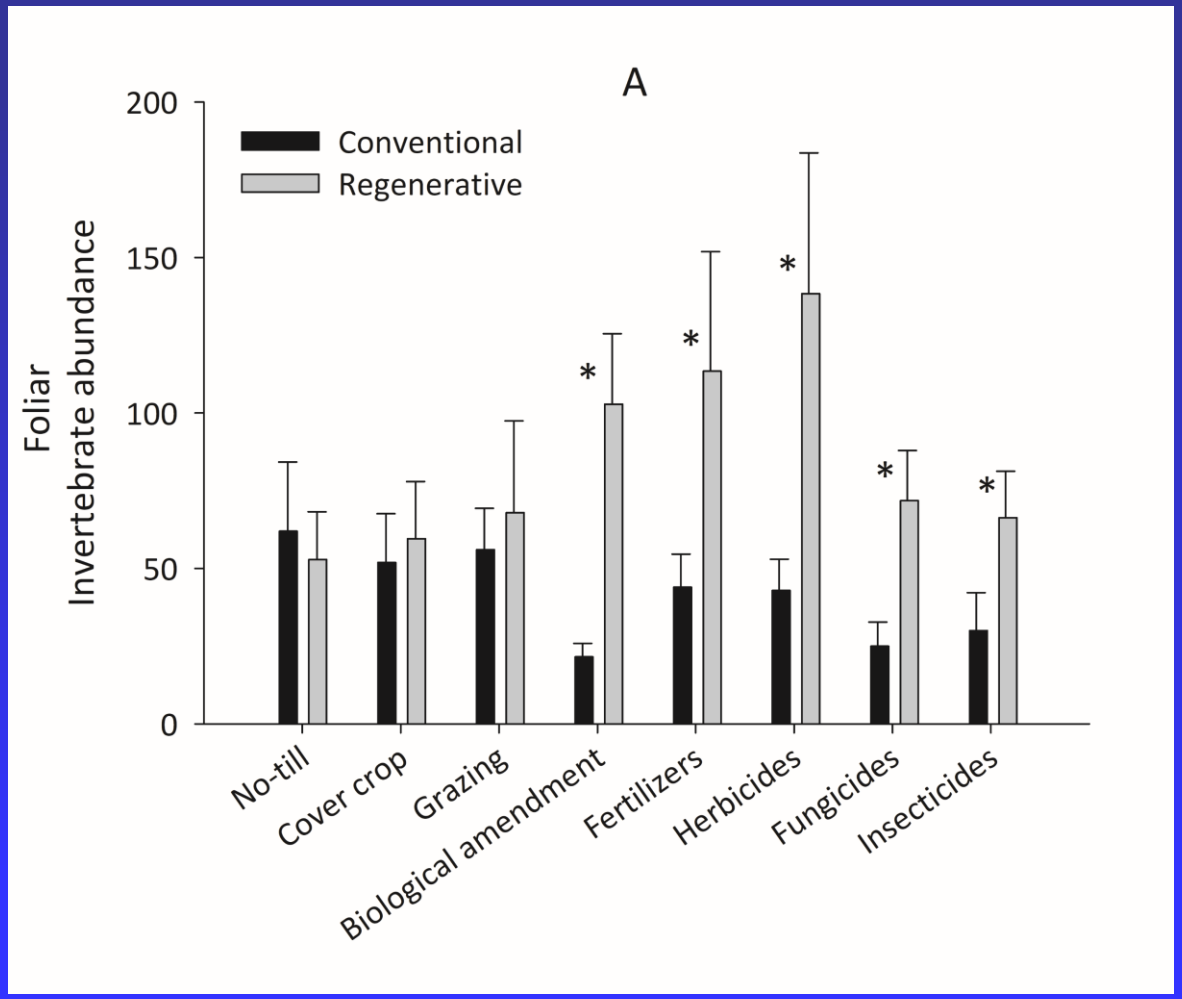
Lundgren et al. 2026. Regenerative agriculture: connecting soil carbon storage, biodiversity, and profit. PeerJ, in revision

Does Regen Reduce Pollution?

Washington and Northern Plains
3-yr Transition

	Conventional	Regenerative
Eliminated synthetic fertilizers	0%	66.67%
Eliminated insecticides	60.71%	88.89%
Eliminated herbicides	0%	62.96%
Eliminated fungicides	28.57%	92.59%

Unintended Consequences of Farm Management



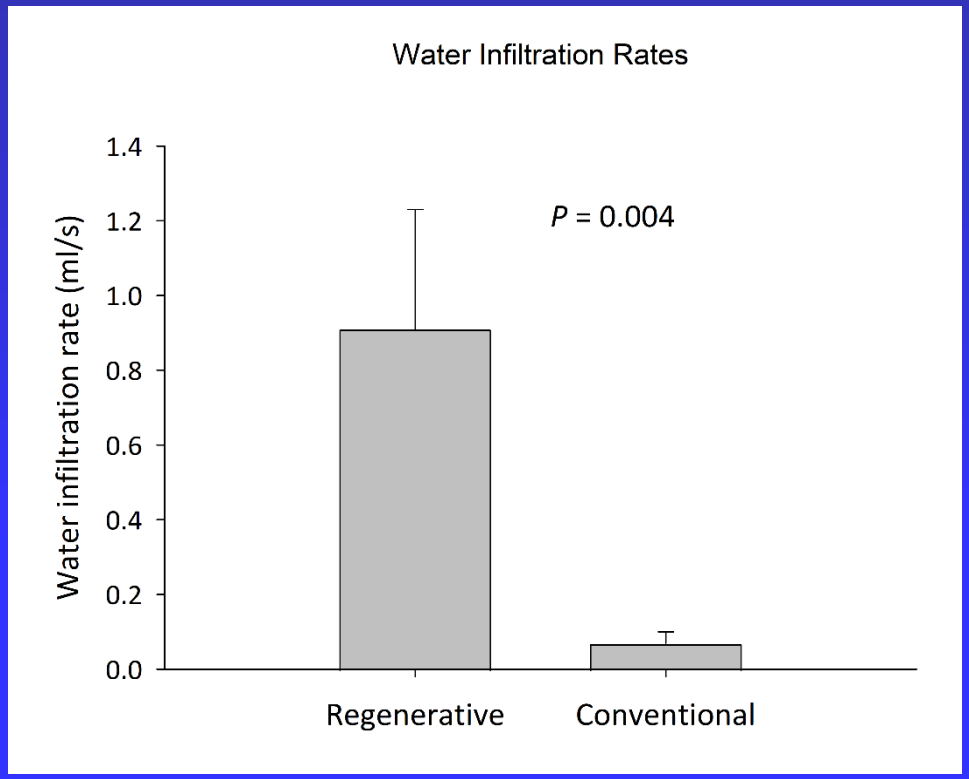
Insecticides kill insects

Chemical fertilizers and herbicides REALLY kill insects

Pecenka et al. 2026. Regenerative wheat management: the relative effects of farming practices on the biodiversity of invertebrates. Insect Conservation and Diversity, accepted pending revision

Does Regen Improve Water Cycling?

Water cycling in CA almonds



Pay it forward on water use

Fenster et al. 2021. Frontiers in Sustainable Food Systems 5: 664359

Does Regen Improve Nutrition?

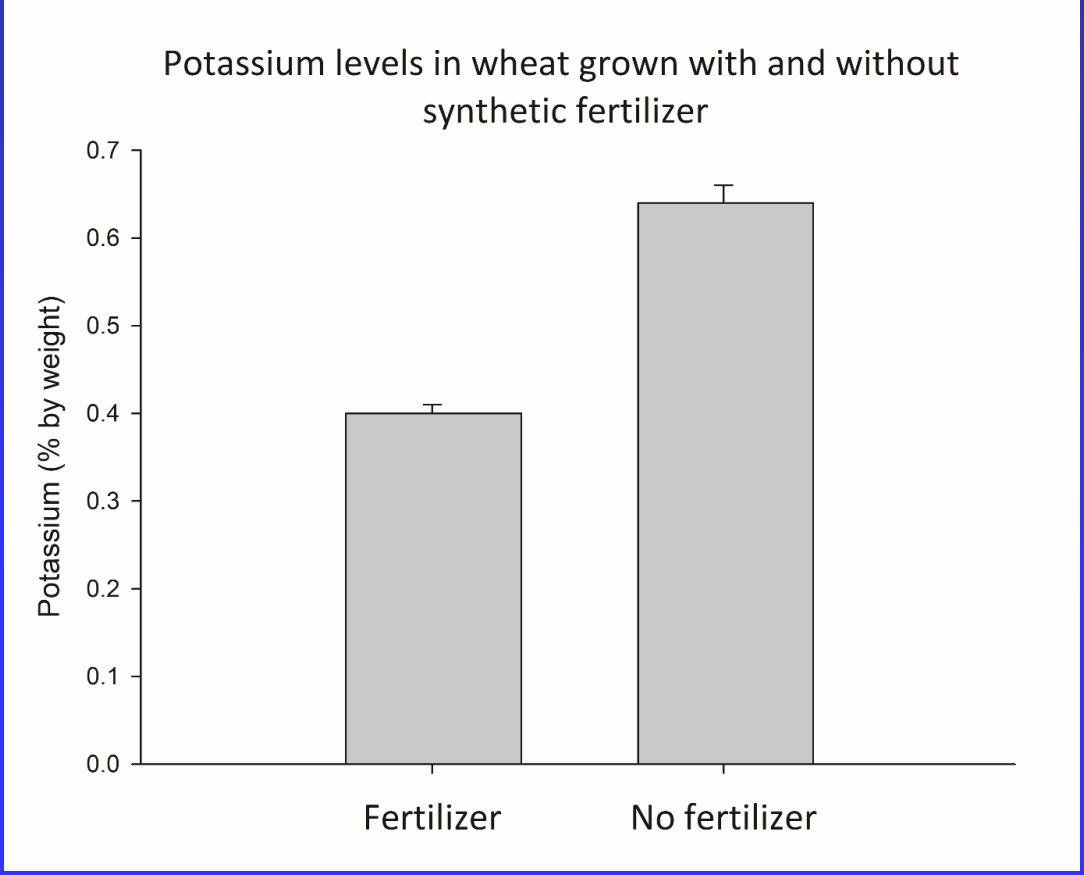
Regen wheat had:

Twice the protein (%N)

Significant increases in:
Phosphorus
Magnesium
Sulfur
Zinc
Iron
Copper
Aluminum

Regenerative Agriculture and Food Nutrition

Chemical Fertilizers and Pesticides



Does RA Increase Profit?

We can feed the world using regenerative agriculture

Regenerative corn, wheat, and soybeans yields = national averages

Conventional producers grow more yield, but it costs them.

On average, conventional yields were higher, but some of the top yielding crops were regenerative

You don’t lose money going regenerative

Net profits were similar among conventional and regenerative farms

Lundgren et al. 2025. Regenerative agriculture: connecting soil carbon storage, biodiversity, and profit. PeerJ, in revision

Is Regenerative Agriculture Real?

Yes


“Regenerative farmers farm smaller and better, not bigger and simpler. Their feet touch every acre of their farm. They grow food for their families and their communities. They celebrate life.”
-Dr. Jonathan Lundgren, Ecdysis Foundation


What next?

Community Development

Develop community around
Science
Education (local and national)
Markets


Globalization!

General Mills

The ROCKEFELLER FOUNDATION

#NOREGRETS Initiative

coalición RURAL coalition

CISCO Foundation

Tumblewood Fund

Grantham Foundation for the Protection of the Environment

Sills Foundation

Tundra Glacier Fund

Tortuga Charitable Foundation

Stranahan Foundation

60+ Donors per year
Hundreds of helpers

TOMKAT RANCH

WALTON FAMILY FOUNDATION

THRESHOLD FOUNDATION

MIGHTY ARROW FAMILY FOUNDATION

Boulder County Parks & Open Space

NRCS

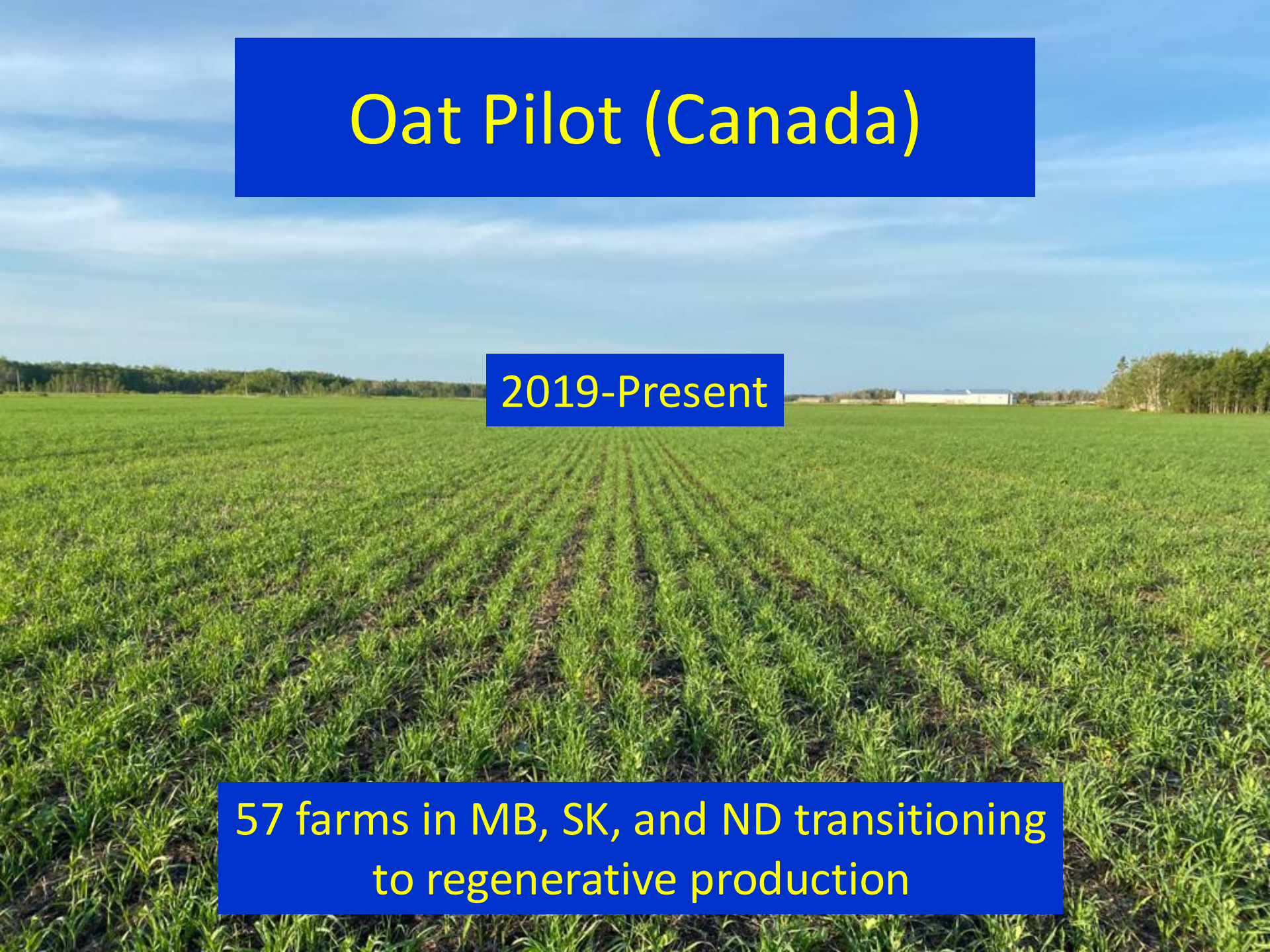
SARE Sustainable Agriculture Research & Education

Please Sign Up Your Farm!

www.ecdysis.bio

Jonathan.lundgren@ecdysis.bio

How to Transition to Regenerative?


Oat Pilot (Canada)
2019-Present
57 farms in MB, SK, and ND transitioning to regenerative production

Farmer Behavior Changes

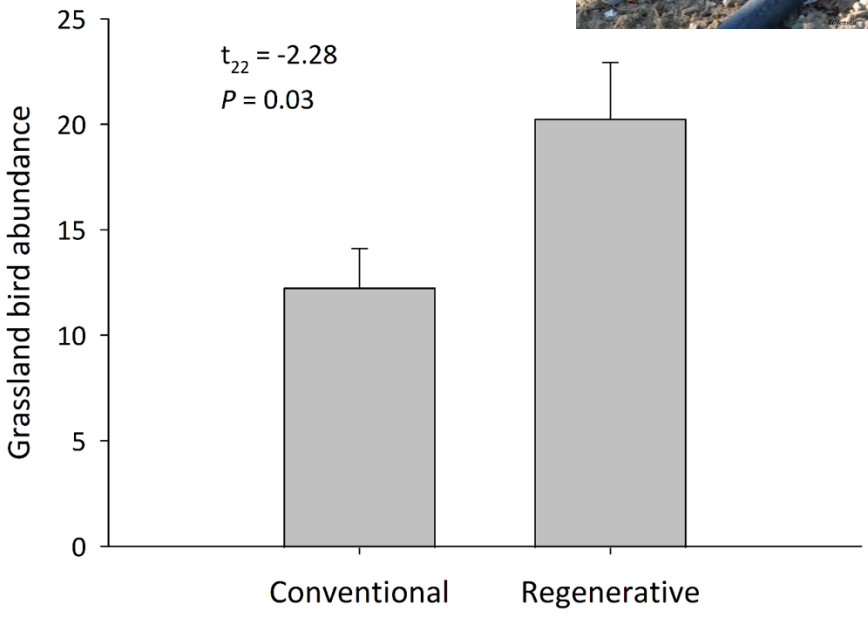
The number of regenerative practices increased over time

No-till adoption increased by 29%

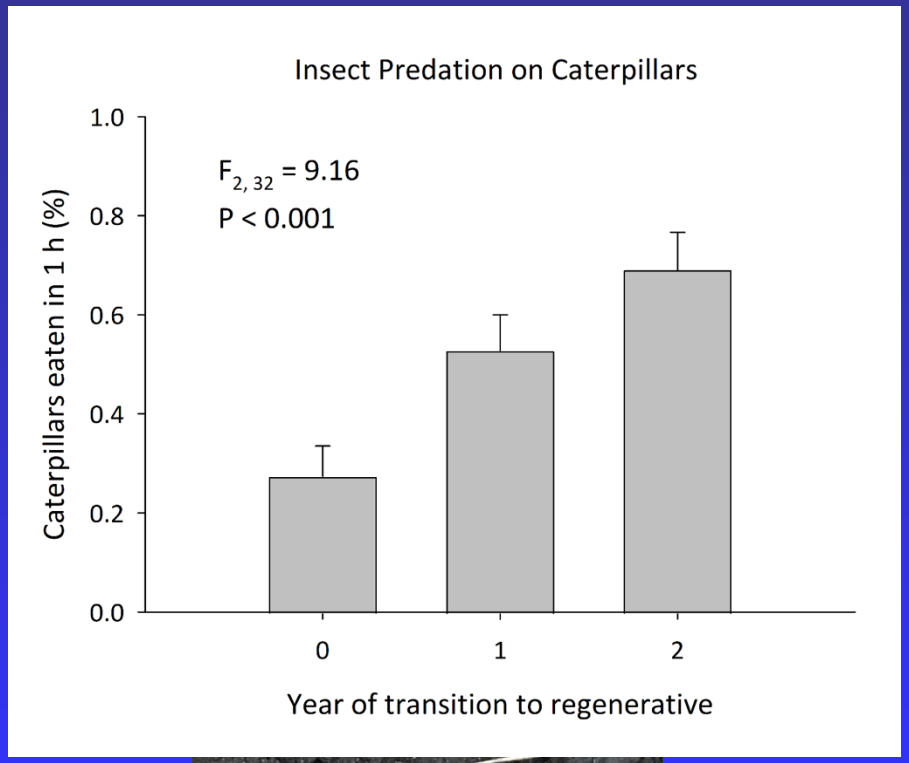
Livestock integration increased by 28%

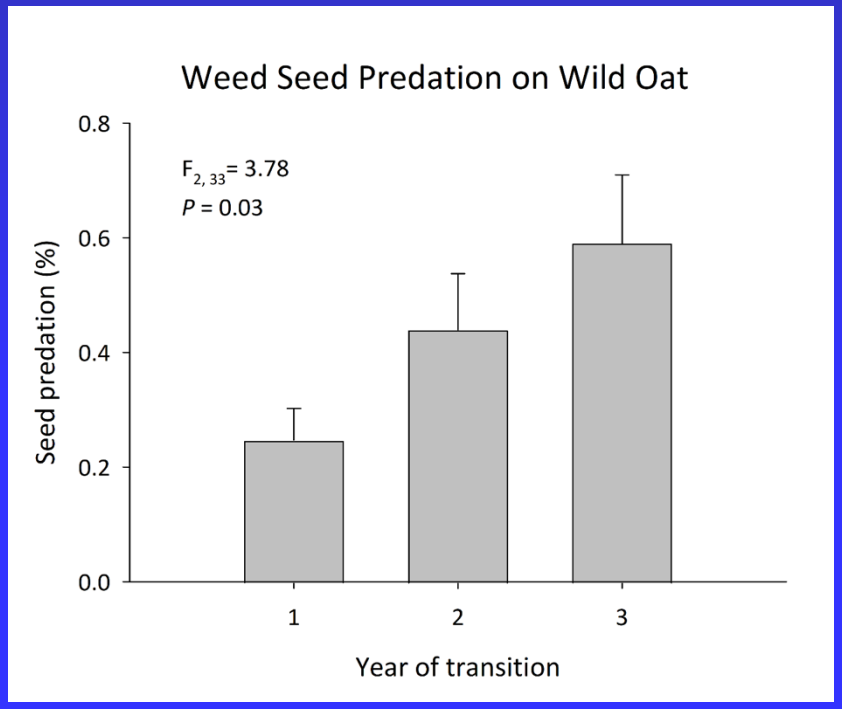
By Year 3, 90% of these farmers eliminated all fungicides and insecticides from their fields

Life Responded Strongly to this Transition

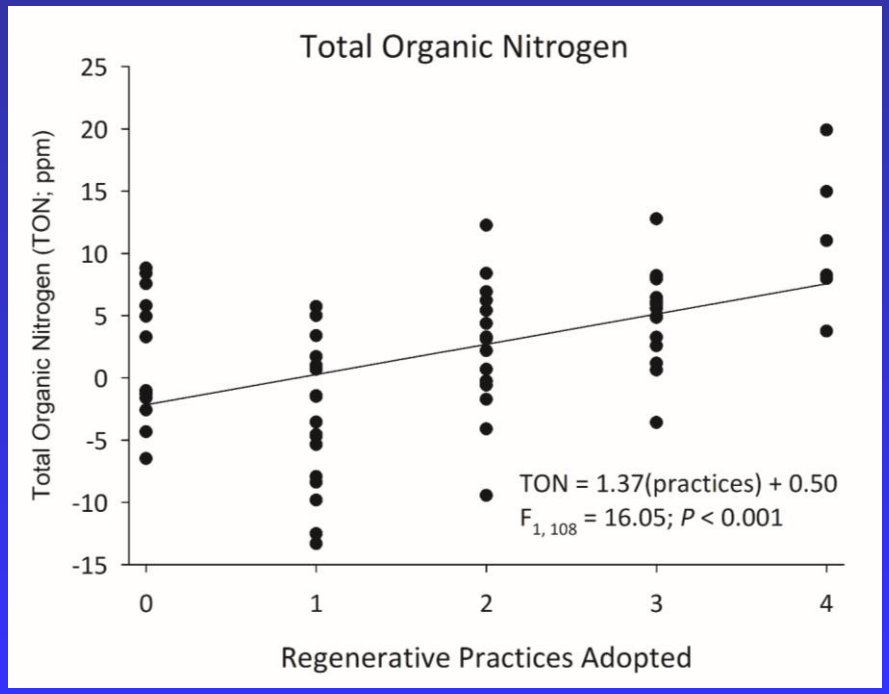


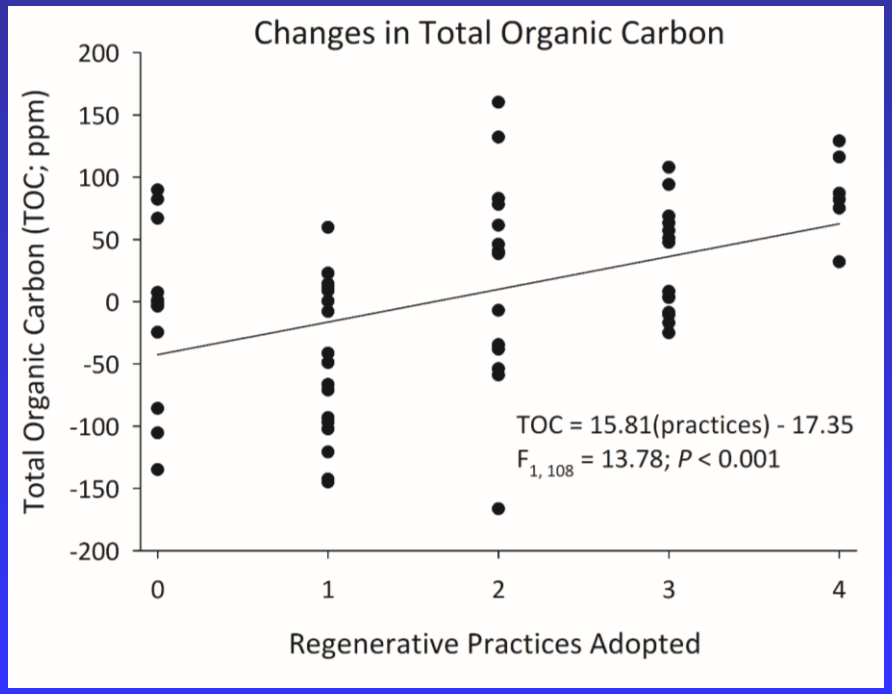
This Life Performed More Services





Adopting More Regenerative Practices Is Better

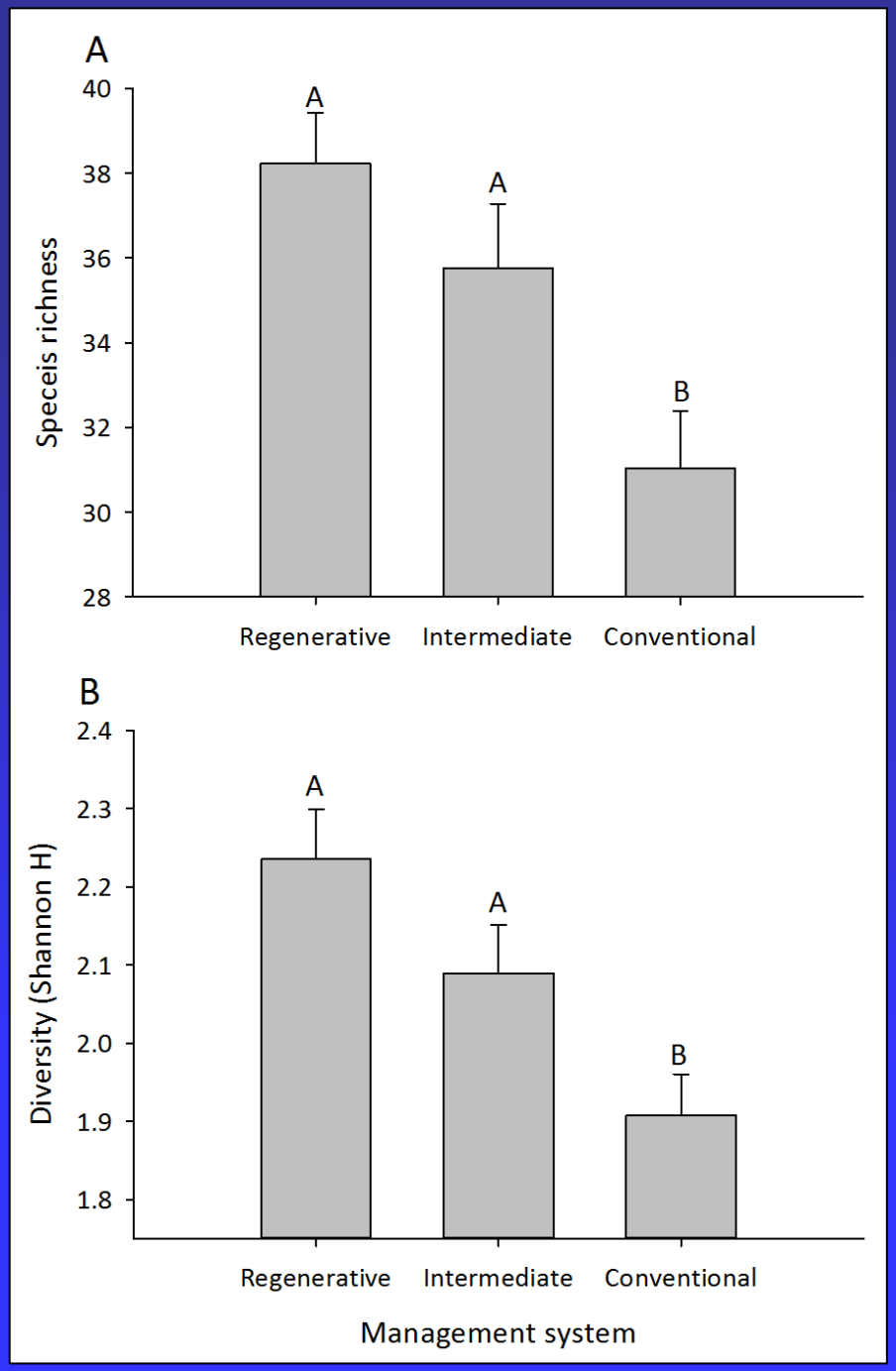




Phosphorus
Haney Soil Health Score

Organic P = 0.23(score) + 0.60; $F_{1, 108}$ = 5.06, P = 0.03
Soil Health = 0.58(score) + 1.73; $F_{1, 108}$ = 4.85, P = 0.03

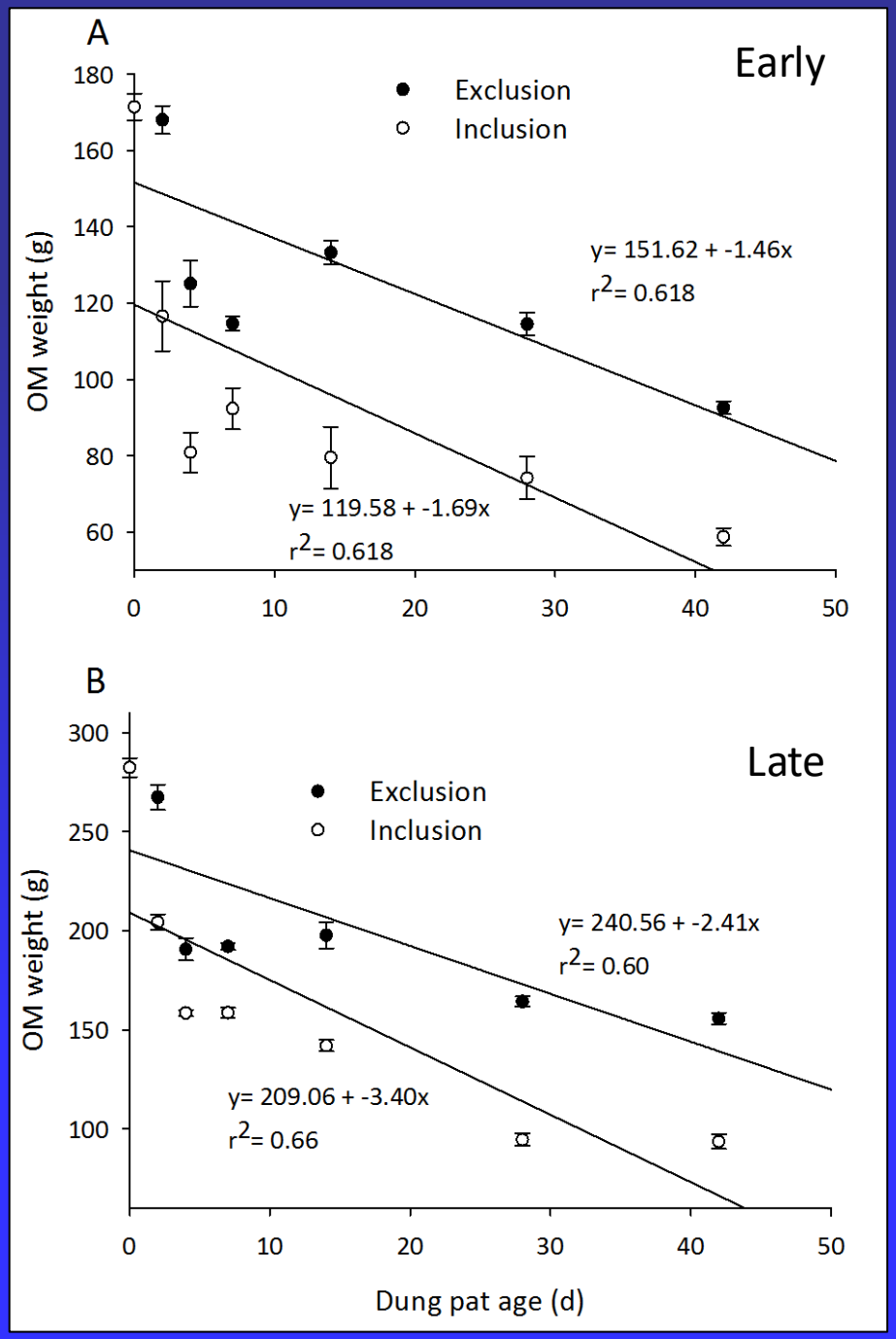
Biodiversity Helps Farmers



Insect community

Species diversity was encouraged by regenerative herd management

Pecenka and Lundgren. 2018. PeerJ 6: e5220
Pecenka and Lundgren. 2019. Basic Appl Ecol 40: 19



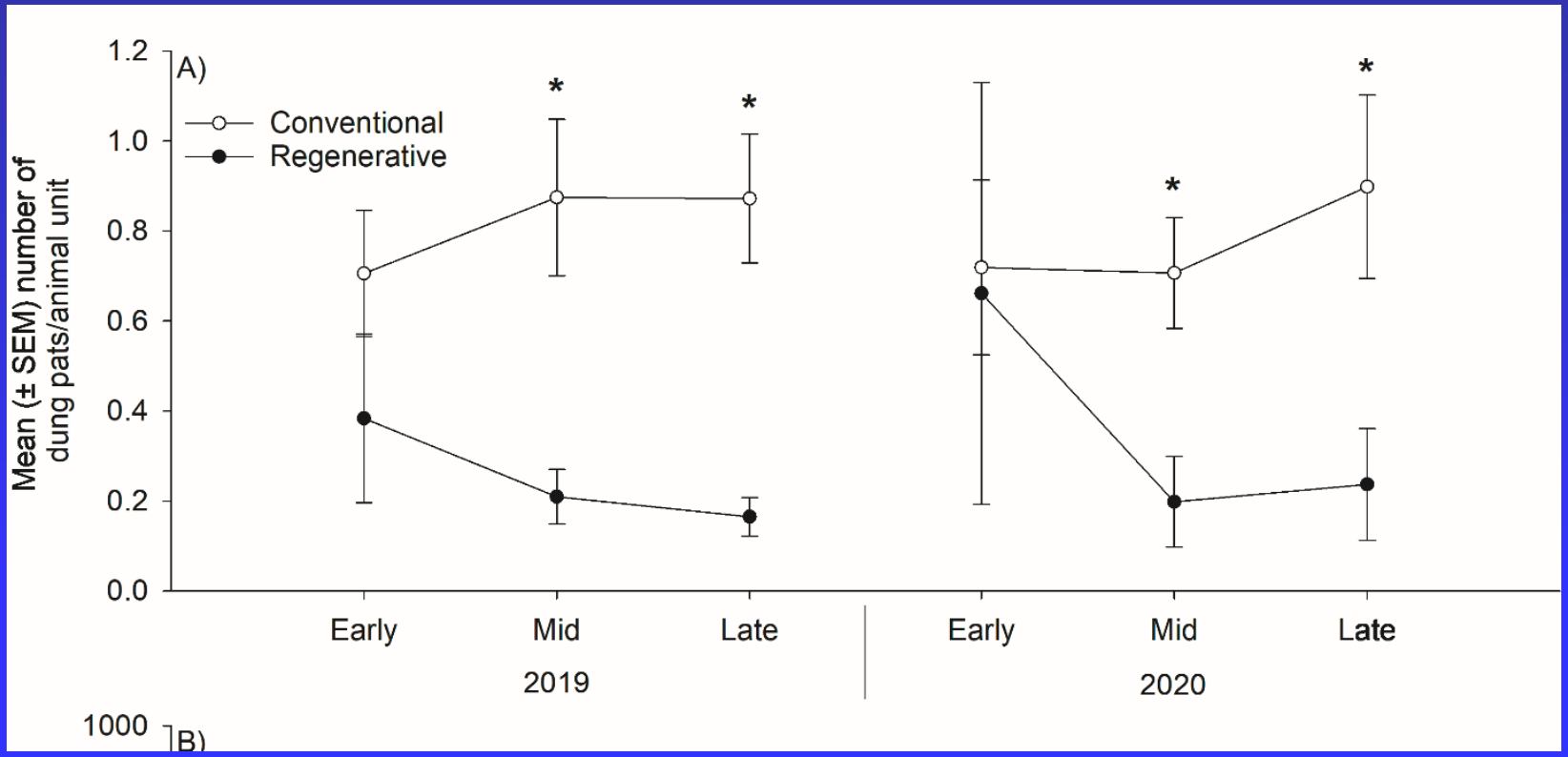
Dung weight

Insects significantly increase the rate of dung degradation

The biggest contribution comes on Day 1

Pecenka and Lundgren. 2018. PeerJ 6: e5220
Pecenka and Lundgren. 2019. Basic Appl Ecol 40: 19

Regenerative pastures have fewer dung pats



Schmid et al. Frontiers in sustainable resource management, *in press*.

Pest Management and Dung

Avermectins
Neurotoxin that disrupts cell membranes

Very effective insecticide and nematicide. Applied in a number of ways.

Applied the majority of cattle in the U.S.

Problems with Avermectins

Most of the treatment comes out in the dung

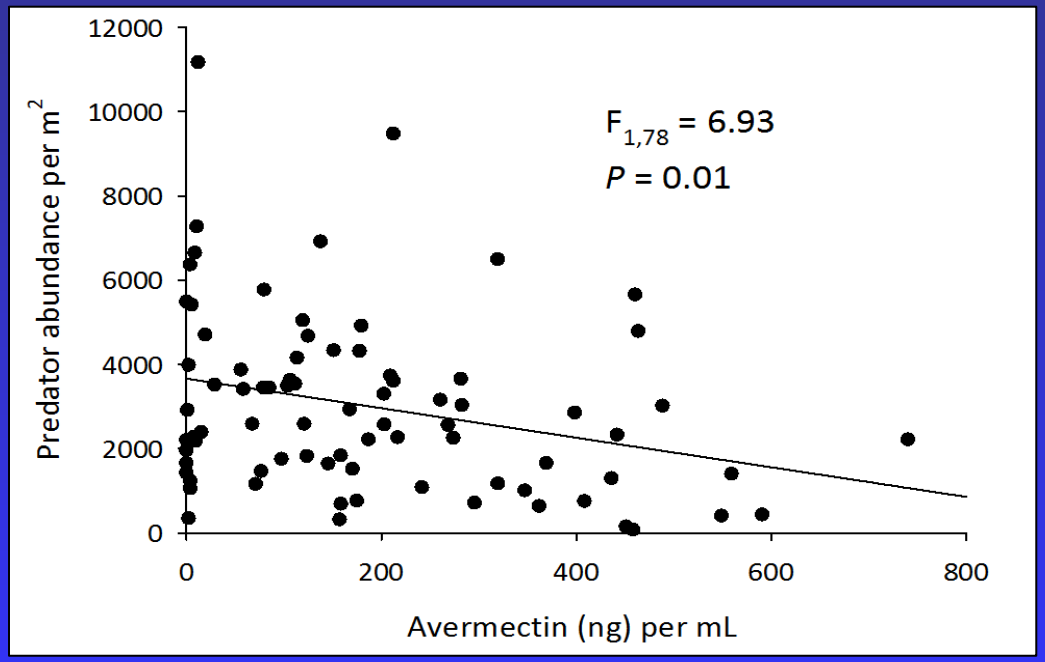
Campbell 1985. Science 221: 823

A half-life of 240 days

Herd 1995. Internat J Parasitol 25: 875

Avermectins kill the 98% of insects (non-pests) found in dung

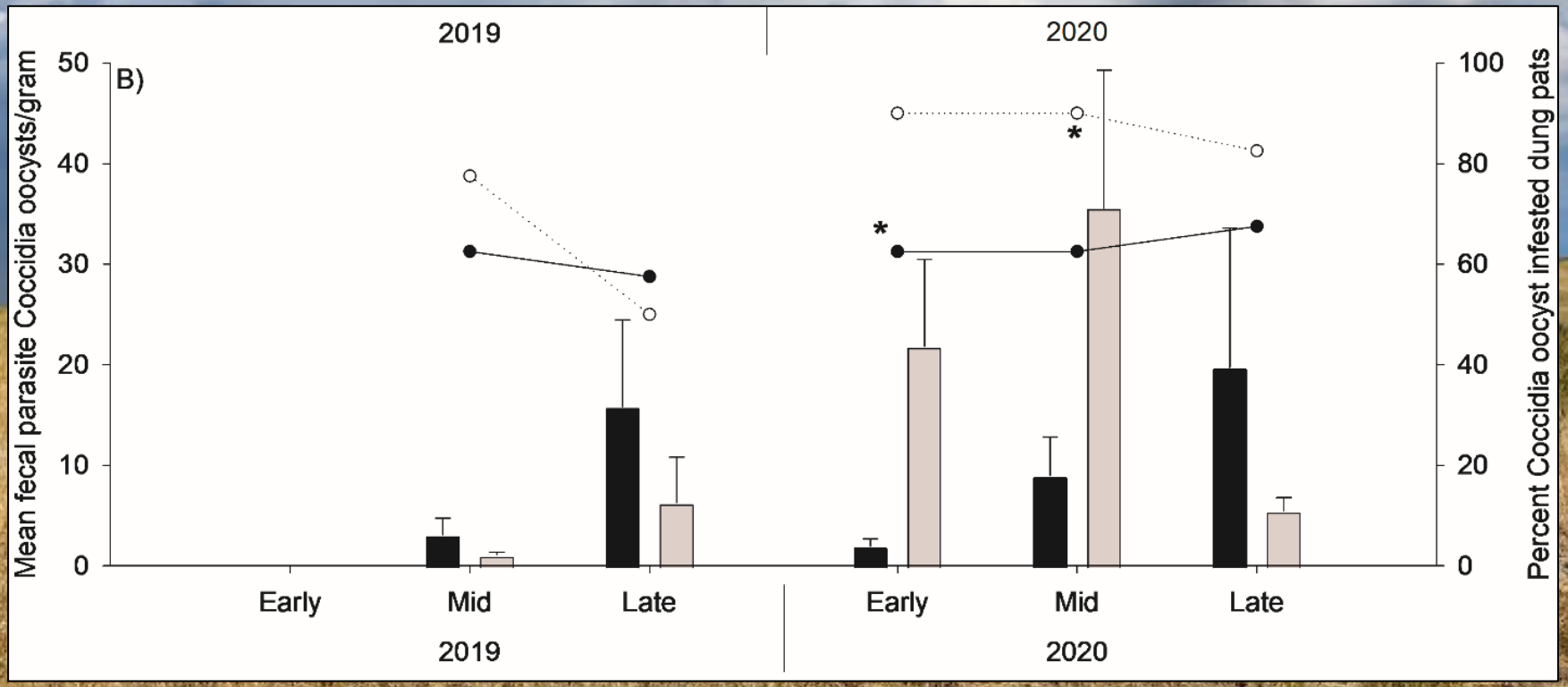
Predators



Predators in dung were favored by regenerative herd management

Pecenka and Lundgren. 2018. PeerJ 6: e5220
Pecenka and Lundgren. 2019. Basic Appl Ecol 40: 19

Good herd management works better than parasiticides

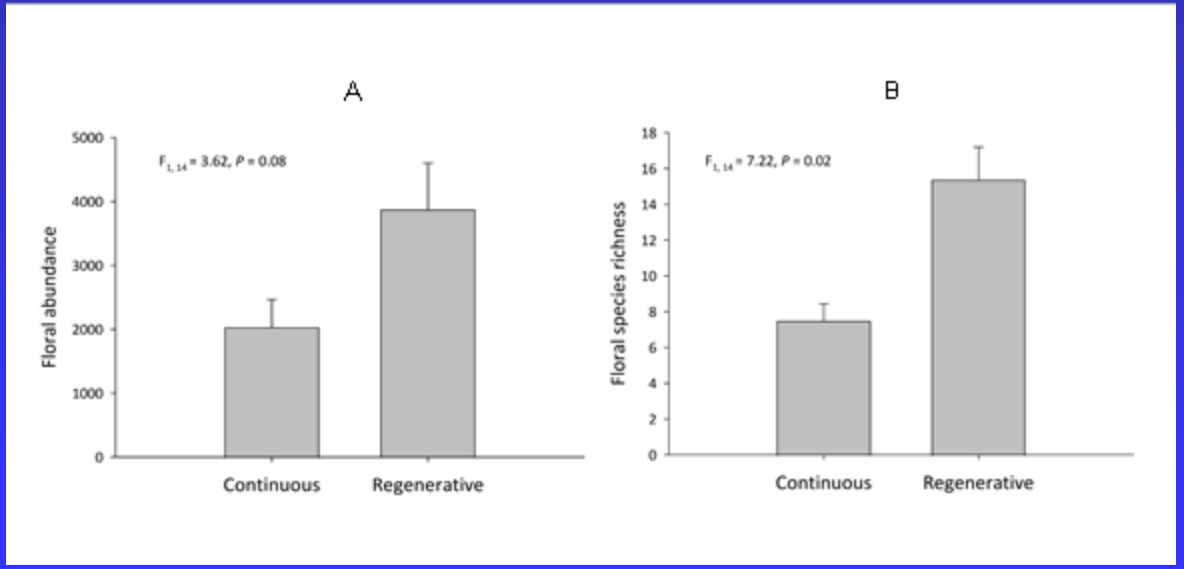


Schmid et al. Frontiers in sustainable resource management, *in press*.

Rangeland Management and Honey Bees

Busenitz and Lundgren, 2025. Frontiers in Sustainable Food Systems 9: 1555238.

There are more flowers on regenerative rangelands



Busenitz and Lundgren, 2025. Front Sust Food Syst, submitted

As plant communities resurge, bees

- Gain more weight (R: 21.92 ± 1.53 kg; C: 16.71 ± 1.20 kg; P = 0.008)
- Produce more brood
- Have fewer pests